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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/698,830

10/31/2003

Rahmi Hezar

TI-36449

1283

23494

7590

05/20/2004

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EXAMINER

LAUTURE, JOSEPH J

ART UNIT

PAPER NUMBER

2819

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/698,830

Applicant(s)

HEZAR ET AL.

Examiner

Joseph Lauture

Art Unit

2819

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 18-21, 23 and 24 is/are rejected.
- 7) ☒ Claim(s) 15-17 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

The application has not been checked to the extent necessary to determine the presence of all possible typographical and grammatical errors.

Applicant's cooperation is requested in correcting any errors of which he/she may become aware in the application.

The Information Disclosure Statements filed 10/31/03 have been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 4; it is confusing what is meant by "a noise shaping system having less than N integrator amplifiers" since N is defined as any number greater than 1. Clarification is required.

In claim 6, line 9, it is confusing what is meant by "...digital error feedback system providing the first analog feedback signal...". Clarification is required.

In claim 13, lines 6-7, it is unclear what is meant by "the integrator having less than N integrator amplifiers" since N is defined as any number greater than 1. Clarification is required.

Claim Rejections - 35 USC § 102

Art Unit: 2819

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 12-14 and 18-21 are rejected under 35 U.S.C. 102 (b) as being clearly anticipated by Galton et al (US 6,697,004 B1).

Galton et al teach in figure (7) a second order analog-to-digital conversion system (700) comprising a delta-sigma modulator (604) that includes: a first flash analog-to-digital converter (710) providing a thermometer coded first digital output (See column 6, lines 5-8) according to a system analog input and according to a noise-shaped first analog feedback signal (See column 1, lines 25-28);

a noise-shaping system having N modulator/integrator amplifiers (704), (708), the noise-shaping system (712) (shown in figure 5) being coupled to the first analog-to-digital converter (710) and providing the first analog feedback according to the first digital output, the first analog feedback signal being noise-shaped by the noise-shaping system (712) to an order N with respect to a quantization error associated with the first analog-to-digital converter;

a digital decimation filter (714) coupled to the output of the converter (710), and providing a multi-bit digital output representative of the analog input.

Claim Rejections - 35 USC § 103

Art Unit: 2819

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-14, 18-21, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galton et al (US 6,697,004 B1) in view of Chen (US 6,710,729) and Ruha et al (6,473,019).

Regarding claims 6-14, 18-21 and 23, Galton et al teach the essential features of the claimed invention as set forth above except for multiple feedback loops feeding an output signal to a subtractor that provides an analog difference to be re-digitized. However, Chen teaches in figures (2) and (3) a delta-sigma converter with noise-shaping circuitry, the converter including a first DAC (342) coupled with a first A/D converter (316), the first DAC providing an analog output which is then subtracted from the system analog input; a first and second feedback loops that provide an analog feedback signal to the first converter, the feedback signals being noise-shaped. The system of Chen further discloses a first integrator (308) coupled to the first DAC (342), a second A/D converter/quantizer (236) (shown in figure (2)) coupled to the first integrator and providing a second digital output based on the output of the integrator, a second DAC (344) (shown in figure (3)) coupled to the second converter/quantizer and providing feedback to the first integrator, wherein the integrator output is noise-shaped, and delay elements (318), (320) and (332) providing an analog delayed

Art Unit: 2819

output. Therefore, it would have been obvious to one skilled in the art to incorporate the teachings of Chen into the system of Galton et al to improve system performance and reliability because this would reduce idle channel tones without high hardware costs (See column 2, lines 10-12).

Regarding claim 24, Chen teaches a second order noise-shaping system for providing a noise-shaped analog feedback to an A/D converter in an analog-to-digital conversion system, the noise-shaping system comprising a first order integrator (308) having a single amplifier; and a plurality of feedback loops providing analog feedback signals to an A/D converter (316) with second order noise-shaping with respect to a quantization error. Chen does not specifically disclose a Digital Signal Processing circuit in a feedback loop. However, the use of such circuits to control such operations as switched capacitor and Dynamic Element Matching among other error reduction techniques are known in the art, as exemplified by Ruha et al. Ruha et al teach in figure (9) a sigma-delta modulator that includes a logic circuit (23A), (23B) and (23C) in each of three feedback paths to control operations of DACs (24). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a logic circuit of the kind used by Ruha et al into the feedback loops of the system of Chen to further attenuate errors because that would yield a reduced generation of kickback noise (See column 1, lines 51-53).

Art Unit: 2819

Allowable Subject Matter

Claim 15-17 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and amended to overcome the 35 U.S.C 112 2nd paragraph set forth in this office action.

Art Unit: 2819

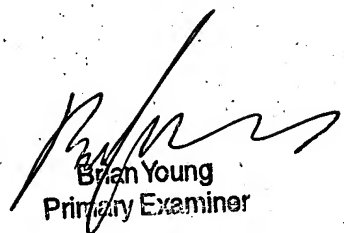
CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Lauture, whose telephone number is (571) 272-1805. The examiner can normally be reached Monday to Friday between 9:30 am and 6:00 PM

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Tokar can be reached at (571) 272-1812. The fax number for the organization to which this application is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (571) 272-1562.

Joseph Lauture
Art Unit: 2819
Date: 05/13/2004



Brian Young
Primary Examiner